



Selecting the Savannah River Site Study Area

Available Information and Accuracy of Estimates

During Phase II of the Savannah River Site (SRS) Environmental Dose Reconstruction Project, *Radiological Assessments Corporation* scientists will review thousands of documents collected during Phase I of the project and gather information that can be used to estimate offsite historical radiation and chemical doses and risks.

We will seek information that shows where groups of people lived while SRS releases were occurring and what food crops and animals were being grown in the region. We will also identify what water supplies were used and in which directions the winds were blowing during the years of the releases. Much of this information can be recorded on maps of the area. For example, a map can show the number of people living in a certain town or county during 1960.

Researchers are beginning to collect this detailed information; therefore, we must define the size of the area to be studied. This newsletter highlights the major factors affecting the *Radiological Assessments Corporation* recommendation that the study area be limited to an 80-kilometer (50-mile) distance from the SRS.

Several methods exist to estimate historical doses from the radionuclide and chemical exposures people received who lived near the SRS. In general, the more detailed the available information, the more accurate the estimate.

Because detailed measurements of radionuclides and chemicals are not available, scientists must use other methods to gather data, including using available measurements in the body, the environment, and at the points of release.

Measurements in the Body

Doses are best reconstructed from measuring the concentrations of specific radionuclides or chemicals in the bodies of those people exposed. If we know the quantity of a radioactive material in a person's body over time, we can estimate the radiation dose and risk that material would produce over time. While these measurements are occasionally available, the information is not routinely collected when exposures are likely to be low.

Measurements in the Environment

Some contaminants from the SRS were measured in the environment. For example, important data about materials in the air can be gathered from air samplers at offsite locations. These samplers record the concentrations of airborne radionuclides or chemicals to which people in the vicinity may have been exposed. Information may also be gathered from the analyses of water, soil, vegetation, crops, animals, and animal products.

This information can be used to estimate the human uptake of radionuclides or chemicals from breathing, eating, or drinking. After making uptake estimates, we can calculate how much of

the radionuclide or chemical accumulated within bodies of people living in the study area. With this information we can estimate dose and risk.

Measurements at the Points of Release

To calculate offsite human exposure when measurements of radionuclides or chemicals in air, water, and food are not available, it is usually necessary to estimate how much of certain contaminants were released from the facility. These release estimates (called the source term) can be used along with computer models to simulate the movement of materials in the environment and estimate offsite air, water, and food concentrations of released materials.

Calculations of exposure, dose, and risk can then be made, but they are less accurate than actual offsite measurements. Most radiation and chemical dose assessments rely heavily on this approach because other data are rarely available over a long periods of time.

Doses Decrease with Distance

Dose calculations can be made for people living at any distance from a site. However, estimates are usually limited to the area surrounding the site because as radionuclide or chemical releases drift, they disperse, deposit, and become less concentrated in the air. Therefore, smaller doses are calculated at increasing distances.

The decision is usually made to limit the size of a study area to avoid spending time calculating very small doses at very large distances. There are exceptions to this general rule. For example, doses for an accident that releases larger-than-usual quantities of a radionuclide for a short period might be calculated for greater distances.

This general decrease in dose at increasing distance has been studied carefully and is well understood. For example, other researchers validated one computer code, called AIRDOS-EPA, by simulating transport of krypton-85 from the

Savannah River Plant to predict concentrations at increasing distances from a release site.^a

One conclusion of these studies is that doses are relatively small and increasingly inaccurate at great distances from the site of release, when compared to doses calculated for people living close to the site. It is reasonable to exclude the regions in which smaller doses and risks are likely.

Recommended Study Area

The large set of detailed, geographically based data and satellite imagery necessary to support this study requires time to acquire, format, and document. Developing information sets for large regions adds little value to the overall dose assessment, and resources would be better spent focusing closer to the site.

Considering our past experience conducting similar studies, the available information, the fact that doses decrease with distance from the site, and the need for wise use of study funds, *Radiological Assessments Corporation* recommends limiting the assessment area for the SRS dose reconstruction research to an 80-kilometer (50-mile) radius from the site.

Certain communities located outside the 50-mile radius will also be included within the study zone. The following map shows the recommended area of the study.

^a Fields, D.E.; Miller, C.W.; Cotter, S.J. Validation of the AIRDOS-EPA computer code by simulating intermediate range transport of Kr-85 from the Savannah River Plant. *Atmospheric Environment* 18:2029-2036; 1984.

Phase II - SRS Dose Reconstruction Study Area



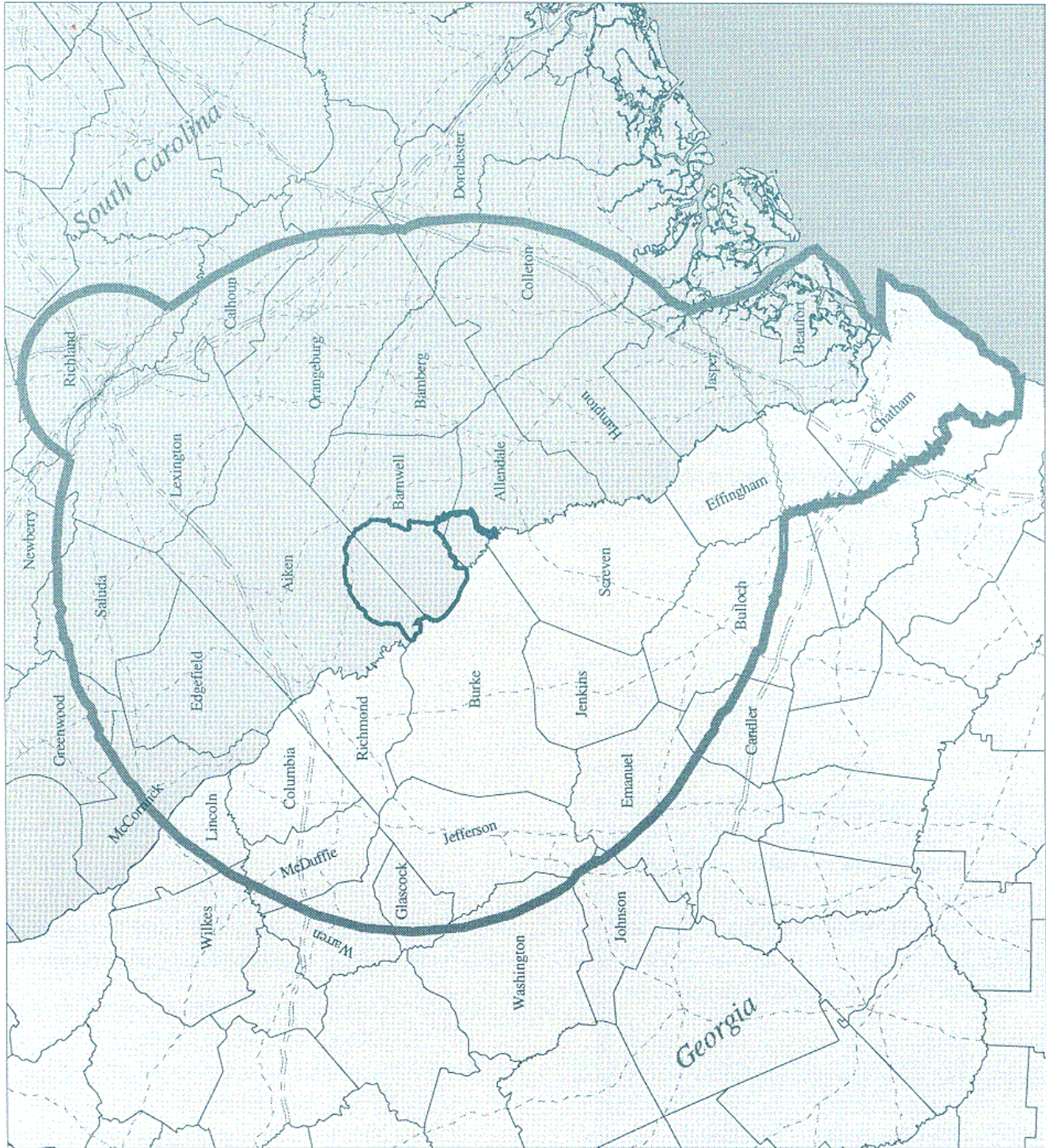
LEGEND

- Savannah River Site Boundary
- Phase II Study Area Boundary
- County Boundary
- Interstate Highway
- U.S. Highway

Scale = 1 : 1810000

0 10 20 30 Miles

0 20 40 60 Kilometers



An Open, Public Process

Public input is critical to this project. We encourage your input and attendance at public meetings to stay informed on the progress of the research. Public meetings will be held in areas near the SRS and will be announced in our newsletters.

The Centers for Disease Control and Prevention, *Radiological Assessments Corporation*, and South Carolina State University scientists wish to provide clear and accessible information to the public. Newsletters and fact sheets will be published regularly to provide updates on the progress of the research. Detailed technical information, including copies of the Phase I database describing research material discovered through June 1995, is available upon request.

Addresses for inquiries and comments are located below. Individuals with information related to the study are encouraged to call the SRS Dose Reconstruction Project toll-free number, 800-637-4766.



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related to the study, please contact:***



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